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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,652	01/30/2006	Mark G. Mortenson	BKL: 114 (c) US	7037

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EXAMINER	
BARTON, JEFFREY THOMAS	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
04/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/535,652	MORTENSON, MARK G.	
	Examiner	Art Unit	
	Jeffrey T. Barton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-9 and 11-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-9 and 11-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 07 January 2008 doe snot place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 9 July 2007

2. The obviousness-type double patenting rejection has been obviated by the approval of the terminal disclaimer filed 29 May 2007.

3. The rejections of claims 15, 16, and 19 under 35 U.S.C. §112, second paragraph are withdrawn due to Applicant's amendment.

4. All other previous rejections are maintained.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 11-13, 20, and 22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11-13, 20, and 22 recite limitations including "which correspond to less than about one-half of the maximum amplitude associated with". It is unclear what applicant means by these limitations or how these limitations are limited for the claim. Applicant's specification shows a figure of a bell curve, B, in figure 4, but shows no

limits on the width of the bell curve. Moreover, the claims do not discuss a bell curve at all, just merely mention the "maximum amplitude". The claims do not list what this maximum amplitude is, where it comes from, how it is determined and how the other frequencies have amplitudes less than half of this maximum. As this is not clear within the claims, the claims themselves are indefinite as the examiner cannot determine the boundaries of the claims. Therefore the claims are interpreted to mean that any symmetric distribution around the primary, harmonic, or heterodyne frequencies include the desirable frequencies, with all the remaining frequencies in the electromagnetic spectrum being undesirable, destructively interfering frequencies.

Claim Rejections - 35 USC § 102/103

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-5, 7-9, 11-14, 17, 18 and 20-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Samulon et al, U.S. Patent 3,076,861.

With respect to claims 1 and 14, Samulon et al teaches a solar cell having an integral filter element (22), i.e., instant at least one means for modifying sunlight, that transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell (see col. 2, lines 56-70). Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Thus, it is the Examiner's position that said filter (22) restricts approximately only destructively interfering wavelengths incident on the silicon wafer (12). It is also the Examiner's position that light that is passed through to Samulon et al's solar cell inherently includes the instant harmonics and heterodynes and that the wavelengths rejected by Samulon's filter are those that would destructively interfere with at least one of the desired frequencies that pass through the filter. (i.e. any wavelength rejected by the filter will be capable of destructively interfering with at least one frequency passed by the filter) By using the filter, Samulon has made a determination as to the desirable and undesirable energies that can be applied to the solar cell. The substrate (14,16) of Samulon et al's solar cell is silicon wafer, i.e., crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42). Samulon et al's Figure 3 shows what is well known in the art, i.e., that silicon has a primary band gap corresponding to a primary wavelength of 1.1 microns.

With respect to claims 3 and 4, Samulon et al's filter element (22), which covers a surface of the solar cell, corresponds to the instant means for modifying sunlight (see Figure 2 and 3; and col. 2, lines 55-70).

With respect to claim 5, semiconductor substrate (12) for Samulon et al's solar cell is made from silicon wafer, i.e., crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42).

With respect to claims 7-9 and 14, the integral filter element (22), i.e., instant at least one means for modifying sunlight, transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell. Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Thus, it is the Examiner's position that said filter (22) minimizes the amount of destructively interfering wavelengths incident on the silicon wafer (12), e.g., it reduces the amount of sunlight which does not correspond to the harmonics and heterodynes.

With respect to claims 11-13, 20, and 22, the filter transmission is symmetric (as seen in Figure 3), and corresponds to the instant plurality frequencies of light, plurality of harmonics, and plurality of heterodynes.

With respect to claims 17 and 18, figure 3 shows the solar spectrum comprising from about 300 nanometers to about 1400 nanometers.

Since Samulon teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed requirement of restricting approximately only destructively interfering frequencies of light which do not correspond to the instant harmonics and heterodynes would obviously have been present once Samulon et al's solar cell has been provided and used. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

Claim Rejections - 35 USC § 103

10. Claims 15, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Samulon et al (U.S. Patent 3,076,861).

Samulon et al teaches a solar cell having an integral filter element (22), i.e., instant at least one means for modifying sunlight, that transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell (see col. 2, lines 56-70). Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Note from the "solar cell response" curve in Samulon's Figure 3 that the primary wavelength for the solar cell is at about 0.85 microns. It is the Examiner's position that

said filter (22) minimizes the amount of destructively interfering wavelengths incident on the silicon wafer (12). It is also the Examiner's position that light that is passed through to Samulon et al's solar cell inherently includes the instant harmonics and heterodynes. Indeed, a harmonic of 0.85 microns is 0.425 microns, and seen in said Figure 3, the filter permits some transmission of 0.425 microns. By using the filter, Samulon has made a determination as to the desirable and undesirable energies that can be applied to the solar cell. The substrate (14,16) of Samulon et al's solar cell is silicon wafer, i.e., crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42). Figure 3 of Samulon shows the solar spectrum from about 300 nanometers to about 1400 nanometers.

Samulon et al teaches the limitations of the instant claims other than the difference that is discussed below.

Samulon et al does not specifically teach a step for determining at least one harmonic and at least one heterodyne. However, the determination of the harmonics and heterodynes for any of the wavelengths in Samulon et al's Figure 3 is a mental thought process, which is not deemed to distinguish the instant device or methods from what is disclosed in Samulon. Samulon et al's Figure 3 already has a primary wavelength, harmonics and heterodynes, and thus, determination of what is already in the prior art does not distinguish over the prior art. For example, a harmonic of the 0.85 micron primary wavelength is 0.425 microns, which is already present in the wavelengths that Samulon et al's filter permits to reach the silicon wafer. Thus, in the absence of anything unexpected, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined heterodynes and

harmonics for the wavelengths in Samulon et al's Figure 3, in particular, for the primary wavelength of 0.85 microns, because the determination of known features that can be calculated by mental thought process and that are already present in the prior art, i.e., harmonics and heterodynes in said Figure 3, would have been within the level of ordinary skill in the art.

Response to Arguments

11. Applicant's arguments filed 7 January 2008 have been fully considered but they are not persuasive.

Regarding the rejection of claims 11-13 and 20 (now also 22) under 35 U.S.C. §112, second paragraph, Applicant's explanation is noted. However, the cited portion of the text does not make clear what this maximum amplitude is, where it comes from, how it is determined, or what other frequencies have amplitudes less than half of this maximum. In other words, there is no way of determining the metes and bounds of these claims as currently recited. The rejection is therefore maintained.

Applicant's arguments concerning claim 1 are not persuasive in part because they concern the intended function of the apparatus. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Claim 1 recites no structure that is distinct from

Samulon. The filter of Samulon will restrict frequencies as required in the instant claims.

In addition, Applicant argues that the reference to Samulon does not disclose or suggest applicant's claimed inventive concepts. The examiner respectfully disagrees. As stated above, the filter element of Samulon does not just filter out UV and infrared light but as shown in figure 3, removes wavelengths of solar energy within applicant's defined photoreactive portion between 300 and 1400 nm. Therefore Samulon is filtering out frequencies within the appropriate region. Also, while Samulon may allow some destructive frequencies to reach the surface, and may filter out some desirable frequencies, applicant's claim limitations do not preclude these scenarios. The limitation "means restricts approximately only destructively interfering frequencies of light" does not require the means to restrict every single destructively interfering frequency or not allow the filter to filter some desirable ones. Therefore although Samulon does not mention the term destructively interfering frequencies, the filter element and method accomplishes the same tasks as applicant and thus meets the claims. Therefore the rejections are maintained.

Applicant states that there was no prior art reference cited against claim 15. Applicant is mistaken, as the office action of 9 July 2007 clearly rejected claim 15 under 35 U.S.C §103(a) as unpatentable over Samulon et al, and this rejection is maintained.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571)272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

JTB
8 April 2008